

A Non-Surgical Treatment of Class III Malocclusions: An Alternative Treatment Option

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ABSTRACT

Class III malocclusions are the least common type of malocclusions, yet they are often more complicated to treat and more likely to require orthognathic surgery for optimal correction followed by orthodontics. ¹ Treating such cases becomes much more challenging when the patient rejects surgery due to fear, cost, or aesthetic concerns. With adequate knowledge and technical acumen regarding suitability for treating class III cases with non-surgical treatment, this alternative treatment option could be used to achieve faster results with prominent dento-facial manipulations. This case report describes a class III crossbite case treated using an innovative non-surgical treatment method using Carrier Class III Motion Appliance.

Keywords: Class III, Non-Surgical alternative

INTRODUCTION

Several treatment options have been proposed for these types of cases,^{3,4} including extraction (usually premolars in the lower or both arches) ^{2,5,6} extraoral traction (horizontal traction of the mandibular arch, or vertical traction in an open-bite case), and distalization of lower molars with devices such as lip bumpers.⁷⁻⁹ Class III malocclusions are associated with discrepancies in the sagittal relationship of the maxilla and the mandible, involving: 1) retrognathic and/or small maxilla; 2) prognathic and/or large mandible; 3) combination of both jaws ¹⁸⁻²⁰

This report describes about a Class III case treated with Carrier Class III Motion Appliance. Surgical correction with orthodontic finishing was recommended to the patient, but her family opposed this treatment option. The patient wanted to correct her malocclusion from an aesthetic point of view and did not want to resolve the prognathism associated while wanting to

preserve the facial characteristics. Therefore, it was decided to modify the dentition, alveolar bone, functional skeletal position and soft tissue with orthodontic treatment. The overall objective in this case was to recover proper mastication, speech function while balancing the face and smile.

CASE REPORT

A 18yr old female patient reported to the clinic with a chief complaint of irregularly placed lower jaw. She had straight profile with anterior divergence. Patient's facial aesthetics were dominated by the mandibular prognathism; the deviation to the left; with a short, retrusive upper lip. The frontal view showed a mild facial hemi-atrophy on the left side and a mild hemifacial hyperplasia on the right. (Fig.2)

She had Angles Class 3 molar relationship and the upper and lower incisors were extremely extruded, with 5mm of overbite and negative overjet of 3mm. (Fig.1) Clinical examination showed irregularities in both

arches and a lateral deviation of the mandible to the left, with a consequent midline shift of the lower incisors in the same direction and a full crossbite anteriorly from the right second pre-molar to the left second pre molar

CEPHALOMETRIC FINDINGS: Cephalometric findings revealed a Skeletal class III relation ($SNA=80^\circ$, $SNB=83^\circ$, $ANB=-2^\circ$, Wits= -4mm). The patient had a hyperdivergent growth pattern ($FMA=24^\circ$

and Gonial angle= 125°). The dentoalveolar findings suggested retroclined maxillary incisors and normally positioned mandibular incisors (U1 to Na=6.5mm, U1 to NA= 30° , L1 to NB= 1mm, L1 to NB= 17° IMPA= 86° and Interincisal angle= 137°). Soft tissue cephalometric analysis revealed retrusive upper lip and a positive lower lip step w.r.t S and E line. (Image.1, Image.2)



Fig: 1 Intraoral Pre -Orthodontic Treatment photographs



Fig: 2 Extraoral Pre -Orthodontic Treatment photographs



(Image.1) PRE-ORTHODONTIC LATERAL CEPHALOGRAM



(Image.2) PRE-ORTHODONTIC OPG

TREATMENT OBJECTIVE

Our treatment objectives included - correction of crowding, rectifying both the extruded upper-lower anterior teeth along with deep curve of spee and thereby, achieving class I functional occlusion with proper mastication and normal speech function together with a balanced face and smile.

TREATMENT ALTERNATIVES

First option - suggested to the patient's family was the surgical option but it was

rejected by them keeping in mind the high cost and risks associated with it.

Second option- proposed was premolar extraction, but as it could have resulted in further flattening of the profile.

Third and final option- recommended was a Carrier Class III motion Appliance. It was selected as the treatment option, as the appliance will intrude the lower molars while extruding the canines- both necessary in Class III correction to change the mandibular occlusal plane and distally reposition the mandible for a better functional and aesthetic relationship. To a certain degree, the appliance will alter the relationship between the maxilla and the mandible by bringing the posterior occlusal plane into a better functional position, thus balancing the face.

TREATMENT PROGRESS

The maxillary arch was bonded with 0.022" self-ligating brackets and .022" edgewise molar tubes. Levelling and alignment were initiated on a round .012" Niti archwire. To increase the length of the maxillary dental arch the ends of the wire distal to molar tubes were not synched. Composite bite ramps were given to the occlusal aspect of lower second molars to prevent the lower extruded incisors from occluding with the upper incisors from flaring out.

The upper arch wires were ligated with sequential arch wires from .016niti to .018niti and then to .016x.022niti in order to level and align the upper arch keeping the composite block intact on lower molars.

Before the placement of Carrier class III Motion Appliance as per the literature it was decided to go ahead with the extraction of wisdom teeth for proper segmental distalization. Four months down the line, with upper arch engaged at .019x.025niti it was decided to extract the wisdom teeth 38,48. Carrier Class III Motion Appliance was bonded in mandibular arch from lower canine to lower first molar region two weeks after the extraction of wisdom teeth. (Fig. 3) Class III elastics (2oz, 5/16") were worn full-time, except during meals, from the mesial hooks on the appliance present on lower

canine to the upper first molar. Class III elastics sequence maintained was- 5/16" (2oz), 1/4" (6oz), 3/16" (8oz) elastics respectively.

In continuation with 1/4" and 3/16" elastics the upper arch wire was upgraded to .019 x .025ss to increase anchorage and to counter the forces with class 3 elastics and start torque correction alongside. After 5 and half months of anteroposterior correction, a Class I occlusion was achieved in the posterior segment, completing stage one (Fig. 4). Lower incisors were retracted a little by lip pressure in the spaces created after the segmental distalization.

Post this stage, patient observed Bimaxillary proclination and expressed the desire to correct with braces treatment. Keeping into consideration the soft tissue factor of short upper lip, anterior divergence with prominent chin and nose, a moderate anchorage has to be maintained if the premolar extraction option is being opted. Therefore, modifying the original treatment plan it was now

decided to go ahead with extraction of all four first premolars with moderate anchorage.

After the extraction of four first premolars, brackets and molar tubes were then bonded in the mandibular arch, with a round .014" Niti wire for levelling and alignment in lower arch and with upper wire reduced down to 16x22niti archwire with active lacebacks in both the arches with .010" stainless steel ligature wire was run under the archwire from the first molar to the canine. (Fig.5)

Seven weeks later, an upper and lower .019" x .025" Niti arch wire was engaged, to complete levelling and start torque control. Five weeks later the upper and lower wire was stepped up to .019x.025" SS archwire and retraction was started keeping in mind the moderate anchorage. After seven and a half months of retraction treatment, a patient satisfactory result was obtained. (Fig. 6)

Case was completed in 25 months of active treatment keeping the COVID lockdown into account.



Fig. 3- Carrier Class III Motion Appliance (Pre-Correction) with 5/16" class 3 elastics and upper arch .019x.025" arch wire



Fig. 4- Carrier Class III Motion Appliance (Post-Correction) with 1/4" class 3 elastics and upper arch maintained with .019x.025" arch wire



Fig. 5- .016x.022niti ligated in upper arch, 0.014niti ligated in lower arch, with active lacebacks post extraction of first premolars

DISCUSSION

Distalization is not the only effect of the Carriere Class III Motion Appliance, clinical experience with the device has demonstrated skeletal and dental changes, alterations of the occlusal plane and the intermaxillary relationship, and improvement of soft-tissue prognathic conditions. Skeletally, the appliance fosters a functional repositioning of the condyle in the temporomandibular complex. As a consequence of lower-molar intrusion and lower-canine extrusion, the mandible repositions along the occlusal plane. This phenomenon has consistently resulted in a counter-clockwise rotation of the posterior occlusal plane—a direct effect of the appliance. Combined with distalization of the posterior mandibular dental segments, retraction of the lower incisors, and a slight

advancement of the upper incisors, it produces a marked improvement in a prognathic profile, and also in attaining a class I dental relationship.

The retro-positioning of the mandible and counter-clockwise rotation of the mandibular plane result in a shortening of the musculature involved in the floor of the mouth. As these muscles become more relaxed, they create a larger space for the base of the tongue in posterior one-third, which is a naturally comfortable and more functional zone. Thereby, resulting in an improvement of the facial profile. (Fig.7)

Menton correction occurred as a consequence of the repositioning of the mandible and opening of the maxillomandibular angle.



Fig. 6- Post orthodontic Intra-Oral photograph



Fig. 7- Post orthodontic Extra-Oral photograph



(Image.3) Post-Orthodontic Lateral Cephalogram



(Image.4) Post-Orthodontic OPG

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